This care process model (CPM) was developed by Intermountain Healthcare’s Obstetrics Development Team under the guidance of the Women and Newborns Clinical Program. It recommends an evidence-based approach for preventing and managing spontaneous or medically indicated deliveries before 37 weeks gestation.

Why Focus on PRETERM BIRTH?

- **It’s common.** Approximately 10 – 12% of U.S. births occur before term.\(^{MANN1}\)

- **It’s dangerous.** Preterm birth (PTB) is associated with 33% of all infant deaths in the U.S. and is a major determinant of short- and long-term morbidity in infants and children.\(^{MANN1}\) Up to 50% of cases of long-term neurologic impairment in children are attributed to PTB.\(^{ACOG1}\)

- **It’s expensive.** The Institute of Medicine (IOM) estimates that the combined annual cost of PTB in the U.S. is $26.2 billion — more than $51,000 per infant.\(^{IOM}\)

- **Consistent, evidence-based care can improve outcomes.** Studies suggest that clinical outcomes can improve if providers consistently identify patients at risk for PTB and, when possible, provide appropriate, risk-specific treatment to prevent or mitigate it.\(^{GOL, MAN2-3, IAM}\) Additionally, a practical and evidence-based approach to managing preterm labor (PTL) should promote wise resource use and knowing which women can be safely discharged without treatment.

Key Recommendations

- **Identify patient risk factors for PTB, and implement best-practice interventions to lower these risks.** This CPM gives numerous recommendations for screening, education, medication, monitoring, and other measures to prevent PTB.

- **Use every contact with your patient—before, during, and after pregnancy—to educate her about PTB and what she can do to lower her risk of delivering early.** For a woman with a prior PTB, education should include an individual PTB recurrence risk assessment.

- **Follow the risk-specific care protocols presented in this CPM,** noting that among the clinical interventions supported by evidence, the appropriate use of progesterone and cerclage yield the most improvement in outcomes.
Most PTB occurs among women with no known risk factors. Recent studies show that targeted prevention efforts can yield positive results and that even a modest reduction in PTB has a significant impact—improving lives and lowering costs.

The map below outlines how Intermountain pursues this reduction, by focusing on key moments of contact with patients before, during, and after pregnancy; identifying PTB risk factors as early as possible; and aggressively providing best-practice interventions to lower risk and improve outcomes.

**Prevention and Management of Preterm Birth**

**Preconception Care**

For ALL patients, as part of routine preconception care:
- **IDENTIFY** PTB risk factors and COUNSEL/REFER/TREAT as appropriate (page 3). Note these recommended interventions:
  - COUNSEL regarding family planning.
  - SCREEN for and TREAT all genitourinary infections.
  - SCREEN for and TREAT smoking and substance abuse.
  - OPTIMIZE treatment of chronic disease.
- **SET** expectations for prenatal care, especially for patients with insulin-dependent diabetes mellitus (IDDM), antiphospholipid syndrome (APS), chronic hypertension, and other conditions requiring special care during pregnancy (pages 12–19).

**Prenatal Care**

For ALL patients, as part of routine prenatal care:
- **IDENTIFY** PTB risk factors.
- **COUNSEL/REFER/TREAT** risk factors as appropriate (page 3). Note these recommended interventions:
  - SCREEN for and TREAT asymptomatic bacteriuria.
  - SCREEN for and TREAT smoking and substance abuse.
  - SCREEN for short cervical length (CL) on routine anatomic survey (using abdominal ultrasound).

**Postpartum Care**

- In the hospital, before patient is discharged
- In targeted follow-up, with patients with prior PTB

For ALL patients, before hospital discharge, COUNSEL regarding family planning, especially the importance of ≥18-month pregnancy interval and need for highly effective contraception (page 8).

For patients with prior PTB* (in the hospital and in follow-up visits at the NICU bedside or in the clinic), PROVIDE interventions listed above AND DETERMINE and DISCUSS:
- Evaluations recommended or received (page 4)
- Patient’s PTB recurrence risk (pages 5–7)
- Interventions recommended before or during next pregnancy (pages 12–19)

PROVIDE highly effective contraception (page 9), if not already done.

*Note: Of all risk factors, prior PTB is most strongly associated with PTB.

PROVIDE interventions listed above AND FOLLOW risk-specific care protocol (pages 12–19). Protocols give guidance regarding:
- Prior PTB
- Short CL on transvaginal ultrasound (TVU)
- Multiple gestations
- Chronic hypertension
- IDDM
- APS

PROVIDE interventions listed above AND FOLLOW risk-specific care protocol (pages 12–19). Protocols give guidance regarding:
- Medication (17-alpha-hydroxyprogesterone caproate [17P], progesterone suppositories, antihypertensives, aspirin (ASA), venous thromboembolism [VTE] prophylaxis, etc.)
- Cerclage placement
- Extra monitoring for mother and baby
- Timing of delivery

*Note: Preventive care is supported by Intermountain patient education. See page 25 for a list of relevant materials for patients and families.
# PTB Risk Factors and Interventions

- Factors in **boldface** are most strongly associated with PTB. GOL, NOR, ESP
- Factors in gray-shaded areas have preventive interventions recommended in this CPM.

## Risk factors for spontaneous or indicated PTB

<table>
<thead>
<tr>
<th>Family planning</th>
<th>Recommended preventive interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Interpregnancy interval &lt; 6 months</td>
<td>• In preconception and postpartum contact, counsel on family planning, especially the need for highly effective contraception and the benefits of an interpregnancy interval ≥ 18 months (see page 9).</td>
</tr>
<tr>
<td>• Maternal age &lt; 18 or &gt; 40 years</td>
<td>• For infertility treatment, implement measures to reduce the chance of multiple gestations (see page 10).</td>
</tr>
<tr>
<td>• Treatment for infertility</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Asymptomatic bacteriuria</td>
<td>• At a preconception consult, screen for and treat all genitourinary infections, including STIs.</td>
</tr>
<tr>
<td>• Other genitourinary infections, including bacterial vaginosis (BV), other sexually transmitted infections (STIs)</td>
<td></td>
</tr>
<tr>
<td>• Pylonephritis</td>
<td></td>
</tr>
<tr>
<td>• Appendicitis</td>
<td></td>
</tr>
<tr>
<td>• Pneumonia</td>
<td></td>
</tr>
<tr>
<td>• Systemic infection</td>
<td></td>
</tr>
</tbody>
</table>

## General maternal health, lifestyle

| • Smoking                        | • At a preconception consult:                                                                          |
| • Substance use                  | • Screen for risk factors such as smoking and substance abuse; treat/refer as needed (see page 11).       |
| • Chronic hypertension           | • For patients with IDDM, APS, or other chronic conditions, optimize management (may need to consult with other providers to adjust treatment plan). |
| • IDDM (insulin-dependent diabetes mellitus) |                                                                                                         |
| • APS (antiphospholipid syndrome) |                                                                                                         |
| • Poor nutrition, either low or high body mass index (BMI) |                                                                                                         |
| • Periodontal disease            |                                                                                                         |
| • Anemia (but not in 3rd trimester) |                                                                                                         |
| • Low socioeconomic status, education |                                                                                                         |
| • Inadequate prenatal care       |                                                                                                         |
| • Anxiety, depression            |                                                                                                         |
| • Life events (divorce/separation, death) |                                                                                                         |

## Pregnancy, reproductive history and health

| • Prior preterm delivery         | In prenatal care, screen for short CL with transabdominal ultrasound (TAUS) at the time of fetal anatomic survey at 18–20 weeks gestation; if < 3 cm, schedule TVU. |
| • Short cervix on transvaginal ultrasound (TVU) |                                                                                                         |
| • Multiple gestation             |                                                                                                         |

- Uterine anomaly, leiomyoma
- History of cervical surgery, anomaly
- Polyhydramnios
- History of 2nd-trimester abortion
- Family history of PTB (first-degree relative)
- Excessive uterine contractility
- Placenta previa or placental abruption
- Vaginal bleeding, especially after 1st trimester
- Abdominal surgery
- Fetal growth restriction
- Fetal anomaly

## Ethnicity

| African-American                  |                                                                                                         |

---

**Note:** You should NOT treat trichomoniasis in pregnancy; treatment increases PTB risk. NOR
PREVENTING PTB:

Can it be done? How much does it matter?

One Utah-based study of women with a history of PTB demonstrated that targeted, evidence-based care in a PTB prevention clinic can result in:

• Lower rates of recurrent spontaneous PTB (48.6% for those receiving specialty care, vs. 63.4% for usual-care patients)
• Later deliveries (36.1 weeks vs. 34.9 weeks)
• Lower rates of composite major neonatal morbidity (5.7% vs. 16.3%)

Additionally, data show that it is possible to reduce the rate of PTB on a larger scale, and even a modest reduction has a significant and lasting impact.

• After Utah accepted the challenge of the Association of State and Territorial Health Officials (ASTHO) and the March of Dimes to prevent PTB, the statewide PTB rate decreased from 9.78% to 9.13% between 2009 and 2012. This 6.6% reduction in 3 years represents approximately 1,000 fewer PTBs and a significant decrease in associated morbidity, mortality, and cost.
• Prior PTB is the greatest risk factor for PTB. All patients with this history warrant special care in subsequent pregnancies; some may also benefit from follow-up evaluation in the weeks after the PTB.

The list below shows the evaluations recommended after a PTB in three particular circumstances. Evaluation results may help you identify underlying risk factors, estimate risk of PTB recurrence for subsequent pregnancy, guide management of the patient’s overall health, and indicate need for special care in subsequent pregnancies.

Spontaneous PTB at < 28 weeks gestation

• Consider ordering hysterosalpingogram (HSG) or sonohysterogram after 6 weeks postpartum to check for uterine anomaly or pathology. Up to 20% of women with second-trimester losses and/or PTB may have uterine cavity anomalies.

• Recommend preconception consult to set expectation for consideration of 17P at 16 weeks gestation, serial cervical length assessment, and possible cerclage (per care protocol on page 13).

Indicated PTB at < 28 weeks gestation due to severe preeclampsia, and HELLP syndrome (a combination of hemolysis [H], elevated liver enzymes [EL], and low platelet count [LP])

• Evaluate for APS. Order test for lupus anticoagulant, anticardiolipin antibodies, and anti-beta2 glycoprotein 1 antibodies.
• Check blood pressure at 6 weeks postpartum; if > 140/90 mmHg, take steps to manage hypertension.
• Recommend preconception consult to assess risk and to plan management prior to and during next pregnancy including initiating daily low-dose aspirin (ASA) in the first trimester (per care protocol on page 14).

Indicated PTB due to IDDM

• Check HbA1c at 6 weeks postpartum visit or as possible.
• Evaluate renal function as needed. Patients with either known renal compromise prior to pregnancy or history of worsening renal function during pregnancy should have baseline renal function evaluated after pregnancy.
• Follow up with endocrinology. Share notes with the provider who regularly oversees patient’s diabetes treatment, and agree on goals for blood glucose control in advance of future pregnancies.
• Recommend preconception consult to assess adequacy of blood glucose control, assess risk, and plan management before and during next pregnancy including initiating daily low-dose ASA during the first trimester (per care protocol on page 17).
KEY MOMENTS, KEY QUESTIONS

After PTB, take these opportunities to teach the patient:
- Postpartum, before she is discharged from the hospital
- At the NICU bedside
- In maternal follow-up visits at the clinic
- In pediatric clinic visits
- Through outreach by your practice (letters, emails, phone calls)

Teaching should answer these three patient questions:
- “Why did this happen?”
- “What are the chances of this happening again?”
- “How can I prevent another preterm birth?”

Estimating PTB Recurrence

A previous PTB is the single greatest risk factor for subsequent PTB. In several studies, the recurrence rate ranges from 25 – 40% depending on the number and severity (very early or late preterm) of spontaneous PTBs, the number of term births, and birth order. Approximately 15% of all spontaneous PTBs occur in women with a prior spontaneous PTB.

This CPM recommends estimating and communicating with the patient about the risk of PTB recurrence. Doing so can powerfully support best-practice interventions in subsequent pregnancies, allowing the provider to:
- Highlight the importance of early and aggressive intervention
- Estimate the impact of potential interventions
- Emphasize warning signs and need for evaluation

Research suggests that this aspect of care is often overlooked: Among women whose pregnancies had ended in very preterm birth, only 24.3% were aware of their individual PTB risk. The following sections explain how to estimate a patient's individual risk based on the figures provided.

About the risk estimate tools

Estimates of PTB recurrence risk use data from several sources depending on the cause of the previous PTB. Most recurrence risks are based on the number and severity of previous PTB and whether or not the patient has had an intervening uncomplicated pregnancy. All of the estimation tools included in this CPM use information that is readily available at the time of a preconception consultation or even a first prenatal visit.

Patient Communication Tool: Preterm Birth Risk Worksheet

Use Intermountain’s fact sheet, Preterm Birth Risk Worksheet (available in English and Spanish), to create personalized education for women who have had a previous PTB. The worksheet can help to communicate to the patient:
- Individual circumstances and factors in the patient’s PTB
- Individual risk assessment
- Recommended evaluations or follow-up
- Opportunities to lower PTB risk for future pregnancies (e.g., contraception-to-achieve pregnancy-interval > 18 months, smoking cessation, etc.)
- The expectation of special prenatal care in the future (e.g., a patient with IDDM will require extra monitoring during pregnancy)

Give this worksheet along with the general-use fact sheet, Preterm Birth: Steps to help prevent it (available in English and Spanish).

See page 25 for a list of related patient and provider resources and access information.
Spontaneous PTB: Risk of recurrence

For patients with a history of spontaneous PTB, the number and order of previous deliveries, both term and preterm, may be used to estimate the risk in a subsequent pregnancy. The recurrence risk estimation tool below (figure 1) uses information gathered on singleton PTBs in the state of Utah between 1989 and 2002. The tool shows the outcomes of a subset of study participants (17,410 women) with three consecutive births.

To use this tool to calculate the risk of spontaneous PTB in the current pregnancy, follow the order of the patient’s two most-recent pregnancies. For example, a woman with a history of spontaneous PTB in her penultimate (second-to-last) pregnancy and a term birth in her most recent pregnancy would be estimated to have a risk of 16.1% for spontaneous PTB in the current pregnancy. A woman with two previous spontaneous PTBs would be expected to have a risk of 46.2%.

**FIGURE 1. Spontaneous Preterm Birth: Risk of Recurrence**

<table>
<thead>
<tr>
<th>First Birth</th>
<th>Second Birth</th>
<th>Third Birth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Term</strong> n=15947 (91.6%)</td>
<td><strong>Term</strong> n=1067 (72.9%)</td>
<td><strong>Term</strong> n=895 (83.9%)</td>
</tr>
<tr>
<td><strong>Preterm</strong> n=1330 (8.4%)</td>
<td><strong>Preterm</strong> n=203 (27.1%)</td>
<td><strong>Preterm</strong> n=214 (16.1%)</td>
</tr>
<tr>
<td><strong>RR = 1.00</strong></td>
<td><strong>RR = 4.15</strong> (3.8 – 4.6)</td>
<td><strong>RR = 2.95</strong> (2.4 – 3.2)</td>
</tr>
</tbody>
</table>

Proportion of PTBs (<37 weeks) in a woman’s first, second, and third birth, excluding women with any indicated preterm inductions (N=17410).
Indicated PTB: Risk of recurrence

In general, maternal and fetal factors that necessitate preterm delivery also increase the risk of recurrent PTB, both indicated and spontaneous. An indicated PTB is associated with an increased risk for a subsequent spontaneous PTB because indicated and spontaneous PTBs often share the same underlying etiologies, such as inflammation or stress.

- Use the tool below (figure 2) to calculate the recurrence risk after an indicated PTB due to preeclampsia.
- To calculate recurrence risk after a PTB due to any other maternal or fetal indication, use the tool (figure 3) on the following page.

Risk after an indicated PTB due to preeclampsia

An estimate of the risk of recurrence following a PTB due to preeclampsia can be made using information reported in the literature. MOS Investigators found that the rate of recurrence in this situation is influenced by two factors: The gestational age (GA) of the most recent PTB and the patient’s BMI. Earlier GA and increasing BMI are both associated with an increased risk of recurrence.

To use figure 2 to calculate the risk of preeclampsia recurrence, locate the patient’s BMI in the appropriate GA category (categories are GA at the time of previous PTB due to preeclampsia). For example, a woman with a previous PTB due to preeclampsia at 30 weeks gestation and a BMI of 23.0 would be expected to have a recurrence risk of 29.3%.

### FIGURE 2. Preeclampsia: Risk of Recurrence

Preeclampsia recurrence risk estimates, based on maternal BMI and GA at time of prior-indicated PTB due to preeclampsia. Developed from outcome data for singleton births in more than 100,000 women between 1989 and 1997.

<table>
<thead>
<tr>
<th>BMI Category</th>
<th>GA at Prior Delivery</th>
<th>Preeclampsia Risk (%) in Second Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI &lt; 18.5</td>
<td>20–32 weeks</td>
<td>Prior preeclampsia: 23.1</td>
</tr>
<tr>
<td>BMI 18.5–24.9</td>
<td></td>
<td>No prior preeclampsia: 1.0</td>
</tr>
<tr>
<td>BMI 25.0–29.9</td>
<td></td>
<td>Prior preeclampsia: 29.3</td>
</tr>
<tr>
<td>BMI 30.0–34.9</td>
<td></td>
<td>No prior preeclampsia: 5.0</td>
</tr>
<tr>
<td>BMI &gt; 35.0</td>
<td>33–36 weeks</td>
<td>Prior preeclampsia: 25.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No prior preeclampsia: 1.0</td>
</tr>
<tr>
<td>BMI &lt; 18.5</td>
<td>37–47 weeks</td>
<td>Prior preeclampsia: 17.8</td>
</tr>
<tr>
<td>BMI 18.5–24.9</td>
<td></td>
<td>No prior preeclampsia: 5.0</td>
</tr>
</tbody>
</table>
Risk after an indicated PTB due to maternal or fetal factors

The recurrence risk estimation tool below (figure 3) was developed based on outcomes of more than 70,000 women who delivered in the state of Utah between 1989 and 2007.\textsuperscript{SIM}

To use this tool to calculate the risk of PTB in the current pregnancy, track the outcome(s) beginning with the patient’s first indicated PTB. For example, a woman who experienced an indicated PTB in her first pregnancy has an overall PTB risk of 17.5\% (1.3\% risk for preterm premature rupture of membranes [pPROM] + 7.2\% risk for spontaneous PTB [sPTB] + 9.0\% risk of indicated PTB) in her next pregnancy. In addition, if the woman experiences another indicated PTB in her second pregnancy, her overall risk for recurrence of any type of PTB in her third pregnancy is estimated to be 51.3\% (4.3\% risk for pPROM + 9.4\% risk for sPTB + 37.6\% risk for indicated PTB).

**FIGURE 3. PTB Recurrence Risk After Indicated PTB\textsuperscript{SIM}**


<table>
<thead>
<tr>
<th>Indicated PTB</th>
<th>Term birth</th>
<th>pPROM</th>
<th>sPTB</th>
<th>Term birth</th>
<th>pPROM</th>
<th>sPTB</th>
<th>Term birth</th>
<th>pPROM</th>
<th>sPTB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Birth 1</td>
<td>n = 1293</td>
<td>17</td>
<td>93</td>
<td>n = 117</td>
<td>11</td>
<td>57</td>
<td>n = 75</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Live Birth 2</td>
<td>n = 1066</td>
<td>82.4</td>
<td>7.2</td>
<td>n = 57</td>
<td>5.3</td>
<td>57</td>
<td>n = 75</td>
<td>7.0</td>
<td>5.3</td>
</tr>
<tr>
<td>Live Birth 3</td>
<td>n = 923</td>
<td>86.6</td>
<td>1.0</td>
<td>n = 57</td>
<td>5.3</td>
<td>57</td>
<td>n = 75</td>
<td>7.0</td>
<td>5.3</td>
</tr>
</tbody>
</table>

\textsuperscript{SIM}\

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Providers should therefore actively— in the hospital after a period, using these or similar talking points:

- "Half of all pregnancies are unplanned. You’ll be busy this year, so let’s make sure we have a plan in place now."
- "If you don’t want any more children, now may be the best time to ensure that. Here are your options for permanent birth control…"
- "If you hope to have another child, it’s best to have at least two years between them. This birth spacing improves your chance for a healthy pregnancy and a healthy baby. It lowers the chance that your baby will be born too early or too small."
- "Waiting at least two years also gives your body a chance to recover and strengthen after this pregnancy — and gives you a chance to focus on your new baby."

Supporting Planned and Healthy Pregnancies

Several of the strongest risk factors for PTB are in the domain of family planning. This section focuses on what providers can do to lower risks of short interpregnancy intervals, unplanned pregnancies, and multiple gestations (in the context of fertility treatment).

Pregnancy spacing and planned pregnancies

Multiple studies have demonstrated the value of interpregnancy intervals of 18 months or greater.

Providers should therefore actively promote the use of highly effective contraception at every possible patient contact—in the hospital after a birth, in postpartum follow-up, in preconception consulted.

- Educate patient and family to promote an interpregnancy interval of 18 months or greater. Ask about their desired family size and the timing they envision. Consider the talking points in the sidebar at left.
- Make it easy for your patient to begin contraception. Offer contraception early and often. Use the chart shown below, and prioritize as follows:
  - **First-line contraception methods**: Intrauterine device (IUD) or contraceptive implant (prior to hospital discharge, if able, or at four-week postpartum visit). Or, if permanent sterilization is desired, advise vasectomy or female sterilization and provide referral.
  - **Second-line contraception methods**: Injectable contraception (prior to hospital discharge, if desired), contraceptive pill, contraceptive patch, or vaginal ring (earliest initiation possible as appropriate for breastfeeding status).
  - **Third-line contraception methods** (condoms or diaphragm/cap): If using these methods, encourage the use of two or three methods simultaneously.

### Comparing effectiveness of contraception methods

<table>
<thead>
<tr>
<th>Most effective</th>
<th>to make the method more effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly effective contraception: Prevents pregnancy more than 99% of the time</td>
<td>• Vasectomy (male sterilization): Use another method for first 3 months.</td>
</tr>
<tr>
<td>Effective contraception: Prevents pregnancy more than 90% of the time</td>
<td>• Injectables: Get repeat injections on time.  • Birth control pills: Take a pill every day.  • Patch, ring: Keep in place, change on time.</td>
</tr>
<tr>
<td>Less effective contraception: Prevents pregnancy 70% to 90% of the time</td>
<td>• Condoms, diaphragm: Use correctly every time.  • Periodic abstinence methods: Use condoms on fertile days (or don’t have sex then). Never methods such as Standard Days Method or Two Day Method) may be easier to use.  • Spermicide: Use correctly every time you have sex. Combine it with another method (e.g., condoms) to increase effectiveness.</td>
</tr>
</tbody>
</table>

| Male condoms | Diaphragm | Female condoms | Spermicides | Periodic abstinence (fertility awareness method, rhythm method) |

| Least effective | about 30 pregnancies per 100 women in one year |
Strategies for reducing the risk of multiple gestations

Multiple gestations are a major risk factor for PTB; since 1980, there has been a steady increase in the incidence of multiple births. Experts agree that this increase is due to the rise of infertility treatment and calculate that:

- 40% of twin births are the result of infertility treatment (21–23% from ovulation induction [OI] or superovulation [SO] treatments with medications; 8–12% result from artificial reproductive technologies such as in vitro fertilization [IVF] and intracytoplasmic sperm injection [ICSI]).
- 80% of high-order multiple births are the result of infertility treatment (33–66% from OI or SO; 13–44% from ARTs).

Given the risks of multiple gestations for both mother and babies, responsible obstetric care will aim to reduce the likelihood of occurrence. In particular, this CPM recommends the following care for women seeking treatment for infertility:

- **When prescribing fertility medications, start with first-line medications at the lowest effective dose to achieve the desired outcome.**
  - The goal of ovulation induction for anovulatory patients is the maturation and ovulation of a single follicle.
  - Oral medications, such as clomiphene citrate and letrozole, are associated with lower risks of twin and higher-order multiple gestations than injectable gonadotropins. For this reason, clomiphene citrate and letrozole are first-line for ovulation induction or superovulation for patients with WHO class II anovulation. Note that for patients with hypothalamic dysfunction, oral medications are unlikely to be effective; these patients should be referred to a reproductive endocrinologist to discuss gonadotropin ovulation induction.
  - Do not increase the dose of an oral agent if a patient does not get pregnant in the first month of treatment unless they fail to respond to the initial dose. Do not increase the dose for ovulatory patients.
  - Oral or injectable fertility medications should not be used for fertile patients who only wish to increase the probability of multifetal gestations. Multifetal gestations are an adverse outcome associated with treating infertility. Decline patient requests to use infertility medications when they are not indicated.

- **For patients with past pregnancies conceived with the assistance of fertility treatments, don’t immediately assume that the woman will need fertility treatment to conceive again.** Circumstances may change, and it is prudent to re-evaluate the patient’s fertility potential after each pregnancy to decide if fertility-promoting medications are indicated.

- **Consider referring to a reproductive endocrinologist if initial treatments are unsuccessful.** Also, consider early referral for specific patient populations listed in the sidebar at left.

- **Educate patients about the treatment-associated risks of multiple gestations.** Patients may choose less-aggressive regimens when they understand the rationale for strategies aimed at avoiding multiple gestations. Explain that every risk of pregnancy is increased in a multiple-gestation pregnancy, including the risk of miscarriage and PTB.
KEY ACTIONS FOR PROVIDERS:

- Screen every patient for substance use disorder (SUD)
- Educate every patient regardless of screening results.

SMOKING CESSATION IN PREGNANCY

Pregnant women are uniquely receptive to smoking-cessation programs, especially when physicians recommend them directly and repeatedly. Smoking-cessation programs in pregnancy have been reported to reduce the rate of PTB by 16—31%. Use the patient education resource, Quitting Tobacco: Your Journey to Freedom (available in both English and Spanish) as a key part of patient education.

FACTS ABOUT OPIOID USE IN PREGNANCY

- Like cocaine use, opioid use is an important risk factor for PTB. Women who use opiates are three times as likely to have PTB as those who don’t.

- Utah is a hot spot for opioid use and abuse. During the 2013—2015 time period, Utah was ranked as the seventh-highest state in the U.S. for drug overdose deaths. According to the Utah Department of Health, since 2002, “prescription opioids have been responsible for more drug deaths in Utah than all other drug categories, such as benzodiazepines, over-the-counter medications, or illicit drugs.”

- Opioid use may be particularly problematic for women. According to NIDA, “some research indicates that women are more sensitive to pain than men and more likely to have chronic pain, which could contribute to the high rates of opioid prescriptions among women of reproductive age. In addition, women may be more likely to take prescription opioids without a prescription to cope with pain, even when men and women report similar pain levels. Research also suggests that women are more likely to misuse prescription opioids to self-treat for other problems such as anxiety or tension.”

- Treatment helps. Pregnant women who receive treatment for substance abuse early in their pregnancy can achieve the same health outcomes as pregnant women with no SUD.

Substance Use Screening and Intervention

Of the 4.3 million infants born annually in the U.S., between 800,000 and 1 million are born to women who used drugs during pregnancy. Of the 4.3 million infants born annually in the U.S., between 800,000 and 1 million are born to women who used drugs during pregnancy.

- 1 in 5 infants are exposed to nicotine
- 1 in 9 infants are exposed to alcohol
- 1 in 20 infants are exposed to illegal drugs

Because prenatal substance use has a host of direct and indirect effects on the risk of PTB, we recommend the following:

- Screen every patient at each encounter, or at least once per trimester during pregnancy. This approach reduces subjectivity, discomfort, and bias, and it is far more effective than guessing. Ask about tobacco use, and screen for other substances using validated tools, such as those listed below.

  - For those 18 years and older: Use the Intermountain-Modified National Institute on Drug Abuse (NIDA) Quick Screen. Any response other than a “Never” answer on at least one question warrants further assessment using the ASSIST-based Assessment (refer to the Substance Use Disorder CPM for instructions).
  
  - For those younger than 18 years: Use the CRAFFT screening tool developed by the Center for Adolescent Substance Abuse Research (CeASAR) at Boston Children’s Hospital and recommended by the American Academy of Pediatrics’ Committee on Substances Abuse for use with adolescents. CRAFFT is a validated tool for alcohol and substance misuse. See The CRAFFT 2.1 Manual for tips on how to use, score, and provide interventions for those at risk (see Appendix A of the manual for a copy of the tool).

Also, to identify patients who take prescription pain medication, consider asking this additional screening question:

  “When you have pain, what do you do for the pain?”

Refer to the Opioid Use in Pregnancy CPM and Tapering Opioid Pain Medication CPM if patients take opioids for pain. In some cases, signs and symptoms will suggest a substance use disorder (SUD), even when screening is negative. Signs and symptoms may also suggest substance use when screening is negative.

- Educate every patient — regardless of screening results. You can assume that all women have some knowledge of the effects of drugs, alcohol, and cigarettes on pregnancy. Ask patients what they know, then fill in as needed. Make sure patients understand that prescription medication, not just “street drugs,” can be misused and present risks. Review Intermountain’s Substance Use During Pregnancy fact sheet with the patient (available in English and Spanish). (See a list of all patient education resources on page 24).

- Intervene and refer as needed. For patients at lower risk for substance use, goals should be to increase insight and awareness about their use and to motivate behavior change. Use the provider tools listed above for management and treatment. Patients at higher risk should be referred to specialty care per the recommendations in the Assessment and Management of Substance Use Disorder CPM.
Risk-specific Protocols for Care in Pregnancy

The tables that follow (pages 13 through 19) provide guidance for prenatal care of patients in these high-risk circumstances:

- **Prior spontaneous PTB.** Of the more than 500,000 PTBs in the U.S. each year, about 15% occur in women with a prior PTB. Effective interventions could potentially eliminate as many as 35–50% of recurrent PTBs.¹

- **Previous indicated PTB due to preeclampsia.** Preeclampsia and related hypertensive disorders of pregnancy affect about 6% of all births in the U.S.²

- **Short cervix during pregnancy.** Short CL on ultrasound has been shown to be one of the best predictors of PTB.³ Progesterone therapy and cerclage placement are sometimes indicated to manage this risk factor. Additional discussion can be found on page 20.

- **Chronic hypertension during pregnancy.** Women with chronic hypertension are at increased risk of superimposed preeclampsia; however, even those who don’t develop preeclampsia tend to have poorer perinatal outcomes than other women.⁴ Evidence-based management is focused on close monitoring and management of blood pressure and increased fetal surveillance.⁵

- **IDDM.** Diabetes is a risk factor for the development of preeclampsia.⁶ Studies show that good glycemic control prior to conception and in early pregnancy is associated with significant reductions in adverse pregnancy outcomes (malformation, stillbirth, and neonatal death) and very premature delivery.⁷

- **Twins.** Nearly 60% of twins are born preterm.⁸ Care during multiple gestation pregnancies should include increased fetal surveillance and close monitoring of blood pressure. Note that although the American College of Obstetricians and Gynecologists (ACOG) Committee Opinion (number 560, April 2013) suggests that mono-di twins be delivered “...between 34 weeks and 6 days and 37 weeks and 6 days...” Other research supports waiting until at least 37 weeks to deliver in otherwise-uncomplicated cases of mono-di twins.⁹

- **APS.** Approximately one-third of women with APS will develop preeclampsia during pregnancy. APS is also associated with numerous other obstetric complications, including recurrent miscarriage, oligohydramnios, prematurity, intrauterine growth restriction, fetal distress, arterial or venous thrombosis, and placental insufficiency.¹⁰ Management of APS in pregnancy involves medication to prevent thrombosis, increased fetal surveillance, and close monitoring and management of hypertension.

The risk-specific care protocols in this CPM represent best-practice based on evidence and expert opinion. The protocols are meant to serve as guidelines; modify care as needed to meet an individual patient’s clinical scenario.
**TABLE 1. Prior Spontaneous PTB Care Protocol**

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Evaluation</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| <24 weeks gestation | • Detailed obstetric history with personalized risk assessment (see pages 5–8).  
• Review signs and symptoms of labor.  
• Baseline urine culture. If urine culture already done, urinalysis with culture if indicated by symptoms or urine dipstick findings.  
• Vaginal wet mount.  
• TVU to measure CL, beginning at 16 – 18 weeks. | • Continue to consider offering 17P to women at risk of recurrent PTB (see progesterone discussion on page 20). ACOG3  
• Treat bacteriuria or bacterial vaginosis with antibiotics if test results positive.  
• If TVU reveals short cervix: – Offer ultrasound-indicated cerclage if CL < 2.5 cm and no multiple gestation. See the Short Cervix During Pregnancy Care Protocol on page 15, and cerclage discussion on page 20.  
– Consider vaginal progesterone in addition to or in place of 17P, per the Short Cervix During Pregnancy Care Protocol on page 15, and cerclage discussion on page 20. |
| ≥ 24 – 34 weeks gestation | • Review signs and symptoms of labor.  
• Urinalysis with culture if indicated.  
• Vaginal wet mount.  
• TVU CL at ≥ 24 – 30 weeks.  
• Assess compliance with progesterone therapy. | • Treat bacteriuria or bacterial vaginosis with antibiotics if test results positive.  
• If TVU reveals short cervix, monitor for uterine contractions. If documented uterine contractions and patient is > 23 weeks gestation, consider management per the PTL Assessment and Management algorithm on page 22:  
– Consider tocolysis. See PTL/PTB medication table on page 21.  
– Consider steroids. See PTL/PTB medication table on page 21.  
– Consider magnesium sulfate. See PTL/PTB medication table on page 21. |

**Patient education materials**

Intermountain fact sheets supporting this risk-specific protocol:  
• **17P for Preventing Preterm Birth**  
• **Cervical Cerclage**  
Fact sheets are available in English and Spanish. See page 25 for a list of all related resources and instructions for accessing them.

**KEY ACTIONS FOR PROVIDERS:**

- Initiate 17P before 20 weeks gestation.  
- Obtain serial CL measurements as indicated in the protocol.
<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Recommended intervention</th>
</tr>
</thead>
</table>
| <20 weeks gestation | • Confirm estimated date of conception (EDC/GA).  
• Check BP and determine the need for treatment; If BP > 160/100 mmHg, initiate antihypertensive therapy:  
  – Labetalol – first-line medication choice.  
  – Nifedipine – second-line medication choice.  
• Obtain baseline results for:  
  – 24-hour urine for total protein and serum creatinine.  
  – Liver function (AST/ALT).  
  – Platelet count.  
• Initiate low-dose ASA therapy as early as possible in pregnancy.  
• Initiate home BP monitoring and establish BP review every 2–4 weeks; instruct patient to call if readings are consistently >160/100 mmHg.  
• Review signs and symptoms of preeclampsia. |
| 20–28 weeks gestation | • Review BP.  
  – If BP consistently > 160/100 mmHg, initiate or increase antihypertensive medication; see first- and second-line medication choices in row above.  
• Perform ultrasound for fetal growth and AFI at 28–30 weeks gestation if:  
  – BP is elevated (>140/90 mmHg).  
  – BP is normal but patient is on antihypertensive therapy.  
  – Clinical suspicion of growth restriction.  
• Consider admission to hospital and Maternal-Fetal Medicine consult and treat with magnesium sulfate (if not already receiving for seizure prophylaxis) and steroids in any of the circumstances listed below; see PTL/PTB medication table on page 21 if:  
  – BP > 160/100 mmHg.  
  – Evidence of placental dysfunction (intrauterine growth restriction [IUGR], oligohydramnios, or elevated umbilical artery Doppler velocimetry).  
  – Significant concern for preeclampsia. |
| 29–32 weeks gestation | • Review BP.  
  – If BP consistently > 160/100 mmHg, initiate or increase antihypertensive medication; see first- and second-line medication choices in row above.  
• Consider admission to hospital and Maternal-Fetal Medicine consult and treat with magnesium sulfate (if not already receiving for seizure prophylaxis) and steroids in any of the circumstances listed below; see PTL/PTB medication table on page 21 if:  
  – BP > 160/100 mmHg.  
  – Evidence of placental dysfunction (IUGR, oligohydramnios, or elevated umbilical artery Doppler velocimetry).  
  – Significant concern for preeclampsia.  
• Initiate antenatal surveillance (nonstress test, amniotic fluid assessment, and biophysical profile) per schedule below:  
  – Mild hypertension (>140/90 mmHg) or preeclampsia: Test twice a week beginning at 32 weeks or at diagnosis.  
  – Severe preeclampsia: Test twice a week beginning at 28 weeks or at diagnosis. |
| Delivery timing | • Preterm delivery is generally accepted if any of the following are present:  
  – Eclampsia.  
  – BP EITHER 160 mmHg systolic or higher, OR 110 mmHg diastolic or higher on at least two occasions while the patient is at rest (and which does not respond to antihypertensive treatment).  
  – Oliguria of less than 500 mL in 24 hours.  
  – Cerebral or visual disturbances.  
  – Pulmonary edema.  
  – Epigastric or right upper-quadrant abdominal pain.  
  – Impaired liver function as demonstrated by elevated liver enzymes (AST >100).  
  – Thrombocytopenia (platelet count <100,000).  
  – Fetal growth restriction or oligohydramnios (in the setting of preeclampsia). |
| Patient education materials | Intermountain fact sheets supporting this risk-specific protocol:  
• 24-hour Urine Specimen  
• Preeclampsia  
• How to Check Your Blood Pressure  
• BP Tracker  
• Fetal Testing: Nonstress test, amniotic fluid assessment, and biophysical profile  
Fact sheets are available in English and Spanish. See page 25 for a list of all related resources and instructions for accessing them. |
## TABLE 3. Short Cervix During Pregnancy Care Protocol

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Recommended intervention</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| < 24 weeks gestation | If CL 1.50 – 2.50 cm on TVU:  
  - Refer for Maternal-Fetal Medicine consult; patient should be seen within 1 week (ideally within 1 or 2 days).  
  - Start or adjust progesterone therapy; note that for patients with both short cervix and prior PTB, evidence regarding the best form of progesterone is unclear (see progesterone discussion on page 20). Give ANY ONE of the following acceptable options:  
    - Vaginal progesterone: Either crinone gel (8% - 90 mg progesterone daily), OR natural progesterone vaginal suppositories (200 mg nightly).  
    - 17P injections, per Prior Spontaneous PTB Care Protocol (see page 13).  
  | If CL < 1.50 cm on TVU:  
  - Refer immediately to labor and delivery for further assessment.  
  | If CL < 1.50 cm on TVU:  
  - Refer immediately to labor and delivery for further assessment.  
  - Admit patient for a minimum 23-hour observation period to assess for active labor and/or intra-amniotic infection (IAI). The CL will be reassessed via sterile digital examination and/or TVU at the discretion of the attending physician.  
  - If evidence of active labor and/or IAI at < 24.0 weeks gestation, counsel the patient regarding risks of maternal morbidity with attempted continuation of pregnancy.  
  - If no evidence of active labor or IAI, offer an ultrasound-indicated cerclage placement (unless multiple gestation; see cerclage discussion on page 20). Consider amniocentesis prior to cerclage placement.  
  - Start or adjust progesterone therapy; note that for patients with both short cervix and prior PTB, evidence regarding the best form of progesterone is unclear (see progesterone discussion on page 20). Give ANY ONE of the following acceptable options:  
    - Vaginal progesterone: Either crinone gel (8% - 90 mg progesterone daily) OR natural progesterone vaginal suppositories (200 mg nightly).  
    - 17P injections, per prior PTB protocol on page 13.  
  | If CL 1.50 – 2.50 cm on TVU:  
  - Refer for Maternal-Fetal Medicine consult; patient should be seen within one week (ideally within 1 or 2 days).  
  - Start vaginal progesterone therapy, either crinone gel (8% - 90 mg progesterone daily), OR natural progesterone vaginal suppositories (200 mg nightly).  
  | If CL 1.50 – 2.50 cm on TVU:  
  - Monitor for uterine contractions:  
    - If contractions noted, admit the patient. See pages 22–23.  
    - If no contractions, discharge with follow-up in 1 week.  
  | If CL 1.50 – 2.50 cm on TVU:  
  - Refer for Maternal-Fetal Medicine consult; patient should be seen within one week (ideally within 1 or 2 days).  
  - Start vaginal progesterone therapy, either crinone gel (8% - 90 mg progesterone daily), OR natural progesterone vaginal suppositories (200 mg nightly).  

| 24 – 28 weeks gestation | If CL < 2.5 cm:  
  - Refer immediately to labor and delivery for further assessment.  
  - Admit patient for a minimum 23-hour observation period if contractions are noted.  
  - Give steroids. See PTL/PTB medication table on page 21.  
  - Give magnesium sulfate. See PTL/PTB medication table on page 21.  
  - If evidence of regular contractions on uterine monitor, give tocolysis. See PTL/PTB medication table on page 21.  
  | If CL 1.5 – 2.5 cm:  
  - Monitor for uterine contractions:  
    - If contractions noted, admit the patient. See pages 22–23.  
    - If no contractions, discharge with follow-up in 1 week.  
  | If CL < 1.5 cm:  
  - Refer immediately to labor and delivery for further assessment.  
  - Admit patient for a minimum 23-hour observation period if contractions are noted.  
  - Give steroids. See PTL/PTB medication table on page 21.  
  - Give magnesium sulfate. See PTL/PTB medication table on page 21.  
  - If evidence of regular contractions on uterine monitor, give tocolysis. See PTL/PTB medication table on page 21.  
  | If CL < 1.5 cm:  
  - Refer immediately to labor and delivery for further assessment.  
  - Admit patient for a minimum 23-hour observation period if contractions are noted.  
  - Give steroids. See PTL/PTB medication table on page 21.  
  - Give magnesium sulfate. See PTL/PTB medication table on page 21.  
  - If evidence of regular contractions on uterine monitor, give tocolysis. See PTL/PTB medication table on page 21.  

| Patient education materials | Intermountain fact sheets supporting this risk-specific protocol:  
  - 17P for Preventing Preterm Birth  
  - Cervical Cerclage  
  Fact sheets are available in English and Spanish. See page 25 for a list of all related resources and instructions for accessing them.  
  | KEY ACTIONS FOR PROVIDERS:  
  - Initiate progesterone therapy at diagnosis, and promote adherence to therapy throughout the pregnancy  
  - Offer cervical cerclage as when appropriate.  

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### TABLE 4. Chronic Hypertension During Pregnancy Care Protocol

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Recommended Intervention</th>
</tr>
</thead>
</table>
| <20 weeks gestation | - Confirm GA/EDC.  
- Check BP and determine need for treatment; if BP > 160/100 mmHg, initiate antihypertensive therapy:  
  - Labetalol — first-line medication choice.  
  - Nifedipine — second-line medication choice.  
- Initiate low-dose aspirin in the first trimester.  
- Obtain baseline results:  
  - 24-hour urine for total protein and serum creatinine.  
  - Liver function tests.  
  - Platelet count.  
- Initiate home BP monitoring and establish BP review every 2 to 4 weeks; instruct patient to call if readings are consistently > 160/100 mmHg.  
- Review signs and symptoms of preeclampsia. |
| 20–28 weeks gestation | - Perform ultrasound to assess fetal growth and amniotic fluid index (AFI) at 28–30 weeks gestation.  
- Check BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in row above); consider antenatal surveillance if hypertension or preeclampsia (see schedule in the row below).  
- Repeat 24-hour urine test if evidence of proteinuria on urine dip or concern regarding preeclampsia.  
- If indications of superimposed preeclampsia or placental dysfunction:  
  - Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
  - Give steroids. See PTL/PTB medication table on page 21.  
  - Give magnesium sulfate (if not already receiving for seizure prophylaxis). See PTL/PTB medication table on page 21. |
| 29–32 weeks gestation | - Check BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in row above).  
- If indications of superimposed preeclampsia or placental dysfunction:  
  - Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
  - Give steroids. See PTL/PTB medication table on page 21.  
  - Give magnesium sulfate (if not already receiving for seizure prophylaxis). See PTL/PTB medication table on page 21.  
- Initiate antenatal surveillance (nonstress test [NST], amniotic fluid assessment [AFI], and biophysical profile) per schedule below:  
  - History of chronic mild hypertension (no medication, normal-range BP) or preeclampsia: NST not recommended.  
  - Chronic mild to moderate hypertension (≤1 medication, normal-to-mild-range BP) or preeclampsia: Weekly modified biophysical profile (mBPP) at 32 weeks.  
  - Chronic severe hypertension (≥1 medication or poorly-controlled BP): Weekly mBPP and NST at 32 weeks.  
  - Gestational preeclampsia without severe features: Weekly mBPP and weekly NST at diagnosis.  
  - Preeclampsia with severe features: Weekly mBPP and daily NST at diagnosis. |
| Delivery timing | Delivery will occur at > 37 weeks GA unless one of the following occurs:  
- Severe preeclampsia.  
- Nonreassuring fetal status noted on antenatal surveillance. |
| Patient education materials | Intermountain fact sheets supporting this risk-specific protocol:  
- How to Check Your Blood Pressure  
- BP Tracker  
- Fetal Testing: Nonstress test, amniotic fluid assessment, and biophysical profile  
Fact sheets are available in English and Spanish. See page 25 for a list of all related resources and instructions for accessing them. |
TABLE 5. IDDM Care Protocol

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Recommended intervention</th>
</tr>
</thead>
</table>
| < 20 weeks gestation | • As early as possible in pregnancy, contact the provider who normally oversees the patient’s diabetes treatment to establish goals and a plan for caring for the patient in pregnancy.  
  • Confirm gestational age GA/EDC.  
  • Evaluate BG control (refer to Gestational Diabetes CPM for how to pharmacologically manage high BG):  
    – Check HbA1C.  
    – Review BG records and document adequacy of BG control; adequate control is > 75% of BG values in these target ranges:  
      › Fasting value 75 – 95 mg/dL.  
      › 1-hour postprandial value < 140 mg/dL.  
      › 2-hour postprandial value < 120 mg/dL.  
  • Check BP and determine need for treatment; if BP > 160 / 100 mmHg, initiate antihypertensive therapy:  
    – Labetalol – first-line medication choice.  
    – Nifedipine – second-line medication choice.  
  • Initiate low-dose aspirin during the first trimester.  
  • Obtain baseline results for:  
    – 24-hour urine for total protein and serum creatinine.  
    – Liver function (AST / ALT).  
    – Platelet count.  
  • Refer for diabetes education/dietitian consult (see resources page 24).  
  • Refer to ophthalmologist for retinal exam.  
  • Refer for fetal echocardiogram for any of the following findings:  
    – HbA1c > 7 %.  
    – Inadequate views of cardiac and outflow tracts on targeted ultrasound.  
    – Suspicious cardiac findings on targeted ultrasound.  
  • Establish BG control:  
    • Check HbA1C.  
    • Review patient’s BG records and adjust insulin therapy if > 25 % BG values are out of target range (see row above for targets).  
  • If indications of preeclampsia, IUGR, or PTL:  
    – Admit for evaluation of preeclampsia, insulin drip, and hourly BG assessment; transfer to tertiary care center if appropriate NICU services are not available.  
    – Give steroids. See PTL/PTB Medication Table on page 23.  
    – Give magnesium sulfate. See PTL/PTB Medication Table on page 23.  
    – Give tocolysis for PTL indication. See PTL/PTB Medication Table on page 23.  
  • Perform ultrasound to assess fetal growth and amniotic fluid index (AFI) at 28 – 30 weeks GA.  
  • Check BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in row above); consider antenatal surveillance if hypertension or preeclampsia (see schedule in the row below).  
  • Repeat 24-hour urine test if evidence of proteinuria on urine dip or concern regarding preeclampsia.  
  • Evaluate BG control:  
    • Check HbA1C.  
    • Review patient’s BG records and adjust insulin therapy if > 25 % BG values are out of target range (see row above for targets).  
  • If indications of preeclampsia, IUGR, or PTL:  
    – Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
  • Evaluate BG control:  
    • Check HbA1C.  
    • Review patient’s BG records and adjust insulin therapy if > 50 % BG values are out of target range (see row above for targets).  
  • Initiate antenatal surveillance (nonstress test, amniotic fluid assessment, and biophysical profile): Begin weekly mBPP and weekly NST at 28 – 30 weeks.  
  • Perform ultrasound assessment, and biophysical profile: Begin weekly mBPP and weekly NST at 28 – 30 weeks.  
  • Establish BG control:  
    • Check HbA1C.  
    • Review patient’s BG records and adjust insulin therapy if > 25 % BG values are out of target range (see row above for targets).  
  • If indications of preeclampsia, IUGR, or PTL:  
    – Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
  • Evaluate BG control:  
    • Check HbA1C.  
    • Review patient’s BG records and adjust insulin therapy if > 50 % BG values are out of target range (see row above for targets).  
  • Initiate antenatal surveillance (nonstress test, amniotic fluid assessment, and biophysical profile): Begin weekly mBPP and weekly NST at 32 weeks.  
  • Perform ultrasound assessment, and biophysical profile: Begin weekly mBPP and weekly NST at 32 weeks.  
  • Establish BG control:  
    • Check HbA1C.  
    • Review patient’s BG records and adjust insulin therapy if > 25 % BG values are out of target range (see row above for targets).  
  • If indications of preeclampsia, IUGR, or PTL:  
    – Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
  • Evaluate BG control:  
    • Check HbA1C.  
    • Review patient’s BG records and adjust insulin therapy if > 50 % BG values are out of target range (see row above for targets).  
  • Initiate antenatal surveillance (nonstress test, amniotic fluid assessment, and biophysical profile): Begin weekly mBPP and weekly NST at 32 weeks.  

Delivery timing

Delivery will occur at > 37 weeks GA unless one of the following occurs:
• Severe preeclampsia.
• Nonreassuring results noted on antenatal surveillance.
• Severe IUGR (< 10 %) and oligohydramnios (AFI < 5 cm).

Patient education materials

Intermountain fact sheets supporting this risk-specific protocol:
• Diabetes: Care before and during pregnancy
• BG Tracker

Fact sheets are available in English and Spanish. See page 25 for a list of all related resources and instructions for accessing them.

KEY ACTIONS FOR PROVIDERS:

- Initiate home BG monitoring and review log every 1 – 2 weeks.
- Follow delivery timing guidelines in this protocol.
### TABLE 6. Twins Care Protocol

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Mono-di twins</th>
<th>Di-di twins</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&lt;23 weeks gestation</strong></td>
<td><strong>Confirm GA/EDC.</strong>&lt;br&gt;<strong>Confirm placentation.</strong>&lt;br&gt;<strong>Review risks and signs and symptoms of PTL, pPROM, preeclampsia, fetal growth abnormalities, and maternal anemia.</strong>&lt;br&gt;<strong>Initiate daily low-dose aspirin in first trimester.</strong>&lt;br&gt;<strong>Initiate checks for TTTS every 2 weeks (may be performed in clinic).</strong>&lt;br&gt;<strong>Alternate limited ultrasound with follow-up ultrasounds every 2 weeks from 16–26 weeks to evaluate for twin-twin transfusion syndrome.</strong>&lt;br&gt;<strong>Perform detailed ultrasound at 18–22 weeks.</strong></td>
<td><strong>Confirm GA/EDC.</strong>&lt;br&gt;<strong>Confirm placentation.</strong>&lt;br&gt;<strong>Review risks and signs and symptoms of PTL, pPROM, preeclampsia, fetal growth abnormalities, and maternal anemia.</strong>&lt;br&gt;<strong>Initiate daily low-dose aspirin in first trimester.</strong>&lt;br&gt;<strong>Perform detailed ultrasound at 18–22 weeks.</strong></td>
</tr>
<tr>
<td><strong>23–28 weeks gestation</strong></td>
<td><strong>Alternate limited ultrasound with follow-up ultrasounds every 2 weeks from 16–26 weeks to evaluate for twin-twin transfusion syndrome.</strong>&lt;br&gt;<strong>After 26 weeks, perform ultrasounds every 3–4 weeks to assess interval growth.</strong>&lt;br&gt;<strong>Perform glucose tolerance testing at 26–28 weeks.</strong>&lt;br&gt;<strong>If indications of preeclampsia, IUGR, fetal distress, or documented PTL:</strong>&lt;br&gt;  - Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.&lt;br&gt;  - Give steroids. See PTL/PTB medication table on page 21.&lt;br&gt;  - Give magnesium sulfate. See PTL/PTB medication table on page 21.&lt;br&gt;  - Give tocolysis for PTL indication. See PTL/PTB medication table on page 21.</td>
<td><strong>Perform serial ultrasounds every 4–6 weeks to assess interval growth.</strong>&lt;br&gt;<strong>Perform glucose tolerance testing at 26–28 weeks.</strong>&lt;br&gt;<strong>If indications of preeclampsia, IUGR, fetal distress, or documented PTL:</strong>&lt;br&gt;  - Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.&lt;br&gt;  - Give steroids. See PTL/PTB medication table on page 21.&lt;br&gt;  - Give magnesium sulfate. See PTL/PTB medication table on page 21.&lt;br&gt;  - Give tocolysis for PTL indication. See PTL/PTB medication table on page 21.</td>
</tr>
<tr>
<td><strong>29–32 weeks gestation</strong></td>
<td><strong>Perform ultrasounds every 3–4 weeks to assess interval growth.</strong>&lt;br&gt;<strong>Check BP and determine need for treatment; if BP &gt; 160/100 mmHg, initiate antihypertensive therapy.</strong> See medication choices in row above.&lt;br&gt;<strong>Initiate antenatal surveillance: twice weekly NST/AFI beginning at 32 weeks gestation.</strong>&lt;br&gt;<strong>If indications of preeclampsia, IUGR, fetal distress, or documented PTL:</strong>&lt;br&gt;  - Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.&lt;br&gt;  - Give steroids. See PTL/PTB medication table on page 21.&lt;br&gt;  - Give magnesium sulfate. See PTL/PTB medication table on page 21.&lt;br&gt;  - Give tocolysis for PTL indication. See PTL/PTB medication table on page 21.</td>
<td><strong>Perform ultrasound to assess fetal growth and AFI at 28–30 weeks gestation.</strong>&lt;br&gt;<strong>Check BP and determine need for treatment; if BP &gt; 160/100 mmHg, initiate antihypertensive therapy.</strong> See medication choices in row above.&lt;br&gt;<strong>Initiate antenatal surveillance: Twice weekly NST/AFI beginning at 36 weeks gestation.</strong>&lt;br&gt;<strong>If indications of preeclampsia, IUGR, fetal distress, or documented PTL:</strong>&lt;br&gt;  - Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.&lt;br&gt;  - Give steroids. See PTL/PTB medication table on page 21.&lt;br&gt;  - Give magnesium sulfate. See PTL/PTB medication table on page 21.&lt;br&gt;  - Give tocolysis for PTL indication. See PTL/PTB medication table on page 21.</td>
</tr>
</tbody>
</table>

**Delivery Timing**
- Delivery will occur at >37 weeks GA unless one of the following occurs:<br>  - Severe preeclampsia.<br>  - Fetal distress noted on antenatal surveillance.<br>  - IUGR of one or both infants (<10%).<br>  - pPROM.<br>
- Delivery will occur at >37 weeks GA unless one of the following occurs:<br>  - Severe preeclampsia.<br>  - Fetal distress noted on antenatal surveillance.<br>  - IUGR of one or both infants (<10%).<br>  - pPROM.

**Patient education materials**
- Intermountain fact sheets supporting this risk-specific protocol:<br>  - Fetal Testing: Nonstress test, amniotic fluid assessment, and biophysical profile<br>  - Fact sheets available in English and Spanish. See page 25 for a list of all related resources and instructions for accessing them.

**KEY ACTIONS FOR PROVIDERS:**
- Initiate twice weekly NST/AFI surveillance beginning at 32 weeks.
- Follow delivery timing guidelines in this protocol.
TABLE 7. Antiphospholipid Antibody Syndrome (APS) Care Protocol

<table>
<thead>
<tr>
<th>Gestational age</th>
<th>Recommended intervention</th>
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</table>
| <20 weeks gestation | • Obtain consult with Maternal-Fetal Medicine.  
|                   | • Confirm GA/EDC.  
|                   | • Check BP and determine need for treatment; if BP > 140/90 mmHg, initiate antihypertensive therapy:  
|                   |   - Labetalol — first-line medication choice.  
|                   |   - Nifedipine — second-line medication choice.  
|                   | • Obtain baseline results for:  
|                   |   - 24-hour urine for total protein and serum creatinine.  
|                   |   - Liver function tests (AST/ALT).  
|                   |   - Platelet count.  
|                   |   - Anti-Sjögren’s-syndrome antigen A (SSA) and anti-Sjögren’s-syndrome antigen B (SSB) antibodies.  
|                   | • Initiate low-dose ASA therapy as early as possible in pregnancy.  
|                   | • Initiate heparin prophylaxis with appropriate monitoring:  
|                   |   - If no history of VTE:  
|                   |     › Give either: Heparin 7,500 units subcutaneous twice a day, or enoxaparin 40 mg subcutaneous once a day.  
|                   |     › Follow platelet count every 3 days x 2 weeks to rule out heparin-induced thrombocytopenia (HIT).  
|                   |   - If history of VTE:  
|                   |     › Initiate enoxaparin 1 mg/kg subcutaneous twice a day.  
|                   |     › Follow platelet count every 3 days x 2 weeks to rule out HIT.  
|                   |     › Adjust dose of enoxaparin to achieve serial Anti-Factor Xa levels in the upper half of therapeutic range (see the VTE, Thrombophilia, Antithrombotic Therapy, and Pregnancy clinical guidelines).  
|                   | • Initiate home BP monitoring and establish BP review every 2–4 weeks; instruct patient to call if readings are consistently > 140/90 mmHg.  
|                   | • Review signs and symptoms of preeclampsia with the patient.  
|                   | • Perform detailed ultrasound at 18–22 weeks.  |
| 20–28 weeks gestation | • Perform ultrasound to assess fetal growth and amniotic fluid index (AFI) at 28–30 weeks GA.  
|                   | • Review BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in row above); consider antenatal surveillance if hypertension or preeclampsia develops (see schedule in the row below).  
|                   | • If indications of preeclampsia, IUGR, or fetal distress:  
|                   |   - Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
|                   |   - Give steroids. See PTL/PTB medication table on page 21.  
|                   |   - Give magnesium sulfate. See PTL/PTB medication table on page 21.  |
| 29–32 weeks gestation | • Review BP and determine need to initiate or adjust antihypertensive therapy (see first- and second-line choices in first row above).  
|                   | • Initiate antenatal surveillance: Perform mBPP twice weekly at 32 weeks.  
|                   | • If indications of preeclampsia, IUGR, or fetal distress:  
|                   |   - Admit for evaluation of maternal/fetal condition. Transfer to tertiary care center if appropriate NICU services are not available.  
|                   |   - Give steroids. See PTL/PTB medication table on page 21.  
|                   |   - Give magnesium sulfate. See PTL/PTB medication table on page 21.  |
| Delivery timing   | • Delivery will occur at >37 weeks GA unless one of the following occurs:  
|                   |   - Severe preeclampsia.  
|                   |   - Nonreassuring results noted on antenatal surveillance abnormal nonstress test (NST), positive contraction stress test (CST), biophysical profile (BPP) < 6, or abnormal umbilical artery (UA) Doppler.  
|                   |   - Severe IUGR (< 10%) with oligohydramnios (AFI < 5 cm).  |

Patient education materials

Intermountain fact sheets supporting this risk-specific protocol:

- Anticoagulant Injections
- Preeclampsia
- How to Check Your Blood Pressure
- BP Tracker
- Fetal Testing: Nonstress test, amniotic fluid assessment, and biophysical profile

Fact sheets are available in English and Spanish. See page 25 for a list of all related resources and instructions for accessing them.

KEY ACTIONS FOR PROVIDERS:

- Initiate ASA therapy before 12 weeks gestation.
- Initiate heparin prophylaxis before 12 weeks gestation.
- Follow delivery timing guidelines in this protocol.
### PROGESTERONE IN MULTIPLE-GESTATION PREGNANCIES

In twin pregnancies with no history of preterm delivery, 17P does not appear to help prevent PTB. However, when the patient has a history of preterm delivery, 17P may be helpful.

Vaginal progesterone has not been well studied in the context of multiple gestation pregnancies. In the case of cervical shortening in twins, the benefits of the use of vaginal progesterone may outweigh the risks.

#### 17P for Preventing Preterm Birth

This fact sheet explains the indications for 17P injections and includes space for a provider to write specific instructions for this therapy. It is available in both English and Spanish.

### CERVICAL CERCLAGE CONSIDERATIONS

Cervical cerclage is indicated based on patient history, ultrasound finding of a short cervix, and exam as follows:

- **History-indicated cerclage:**
  - Women with a clear history of cervical insufficiency (painless cervical dilation at 24 weeks or less in a previous pregnancy) may be offered prophylactic cerclage at 12 – 14 weeks gestation. There are no data suggesting whether a McDonald or Shirodkar cerclage is associated with better outcomes in this setting.
  - For a patient with a history of cervical insufficiency and significant cervical scarring or a short cervix following loop electrosurgical excision procedure (LEEP) or cervical surgery, the Shirodkar approach may be best; this patient may also be offered the alternative plan of expectant management with serial CL assessment with TVU between 16 and 24 weeks gestation.

- **Ultrasound-indicated cerclage:**
  - Women with a history of spontaneous PTB and with cervical shortening (CL < 2.5 cm) before 24 weeks gestation are candidates for ultrasound-indicated cerclage.
  - Women without a history of spontaneous PTB found to have a short cervix (without membranes visible) before 24 weeks gestation have not been shown to benefit from cerclage; offer these women vaginal progesterone therapy.

- **Exam-indicated cerclage:**
  - Women with amniotic membranes visible at the external os of the cervix on speculum exam are candidates for an exam-indicated (or “rescue”) cerclage.
  - Exam-indicated cerclage should only be placed in women who are less than 24 weeks pregnant.

### Cerclage removal

In most cases, the cerclage should be removed when delivery is anticipated — usually at 36 or 37 weeks in asymptomatic patients. This timing maximizes the chance of fetal maturity while minimizing the chance of cervical injury due to the onset of labor.

Women who have threatened PTB associated with vaginal pain or bleeding should have the cerclage removed if attempts at tocolysis are not successful.

There is some controversy about the timing of cerclage removal after preterm premature rupture of the membranes. Some literature suggests that the latency will be prolonged if the cerclage is left in place. However, other studies suggest that there is an increased risk of infection if the cerclage is left in place. For women with pPROM at:

- **< 24 weeks** gestation, consider removal of the cerclage.
- **24 – 32 weeks**, administer betamethasone (BMZ), 12 mg IM every 24 hours x2 doses once patient has achieved 48-hour corticosteroids; consider removal of cerclage.

### Cerclage in multiple-gestation pregnancies

The role of cerclage in twin pregnancy is unclear. Only a few studies have examined the use of cerclage for short cervix in twins. Despite the limited information, it appears that maternal and neonatal outcomes are worse with cerclage for the twin patient with a short cervix found on TVU. Thus, cerclage is not recommended in a twin pregnancy — unless the patient has a prior diagnosis of cervical insufficiency, in which case she should be offered a prophylactic cerclage.
Identifying women with preterm contractions who will deliver early is an inexact process. In one review, about 30% of PTBs resolved spontaneously. Others have reported that 50% of patients hospitalized for PTL go on to deliver at term.\textsuperscript{11} The PTL Assessment and Management algorithm on page 22 presents a practical and evidence-based approach to assessing and managing women with symptoms of PTL (algorithm notes appear on page 23).

The use of medications (see table below) is generally reserved for pregnancies between approximately 22 and 34 weeks gestation as follows:

- **For pregnancies at 24 or fewer weeks**: Consult with neonatologists, and counsel patient and family to determine choices for care and resuscitation.

- **For pregnancies at 25–34 weeks gestation**: Consider allowing labor to progress to delivery without the use of tocolytics; medication for fetal benefit is not indicated at this GA.

Note that per risk-specific protocols, some high-risk patients may already be receiving medication for fetal benefit and tocolysis.

### TABLE 8. Preterm labor (PTL) and preterm birth (PTB) medication considerations

<table>
<thead>
<tr>
<th>Use in PTB</th>
<th>Recommendations</th>
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| **Fetal benefit** | To lower risk of RDS, give a corticosteroid to all patients at 23–34 weeks gestation:  
- Betamethasone: 12 mg IM every 24 hours x 2 doses.  
  If betamethasone is unavailable, may use dexamethasone: 6 mg IM every 12 hours x 4 doses.  
  Consider rescue corticosteroids (repeat course of antenatal corticosteroids) in women who are < 34 weeks of gestation, who are at risk of preterm delivery within the next 7 days, and whose prior course of antenatal corticosteroids was administered > 14 days previously. Rescue course corticosteroids could be provided as early as 7 days from the prior dose.  
  Late preterm steroids given between weeks 34 and 36 6/7 decreases newborn respiratory morbidity (14% to 11%) when given to women with a singleton gestation who are at risk for preterm delivery within 7 days and who have not previously received corticosteroids.  
For neuroprotection at 32 weeks gestation, give:  
- Magnesium sulfate, IV: Bolus 6 g over 40 minutes; then, infuse 2 g/hour maintenance dose from premixed 20 g/500 mL bag until delivery or until 12 hours of therapy. (If preterm delivery seems unlikely after 12 hours of therapy, discontinue therapy.)  
  If magnesium is used for neuroprotection and patient continues to have contractions, magnesium may be combined with another medication for tocolysis.\textsuperscript{ACOG1} (See row below.) |
| **Tocolysis** | If < 32 weeks gestation, give:  
- As first choice, indomethacin: 50 mg PO x 1; then, 25 mg PO every 6 hours up to 48 hours.  
- As second choice, nifedipine: 10 mg PO (may repeat every 15 minutes x 4 doses); then, 20 mg PO every 6 hours up to 48 hours (maximum dose 160 mg in 24 hours).  
If 32–34 weeks gestation give:  
- Nifedipine: 10 mg PO (may repeat every 15 minutes x 4 doses); then, 20 mg PO every 6 hours up to 48 hours (maximum dose 160 mg in 24 hours).  |
| **GBS prophylaxis** | Follow Intermountain’s Prevention of Perinatal GBS Disease in Labor guideline. For all patients, as needed, give either:  
- Penicillin G: 5 million units IV initial dose; then, 2.5–3.0 million units every 4 hours until delivery.  
- Ampicillin: 2 g IV initial dose; then, 1 g every 4 hours until delivery or the threat of PTB is low.  
If penicillin allergy, low risk (e.g., isolated maculopapular rash without urticaria or pruritus):  
- Cefazolin: 2 g IV initial dose; then, 1 g every 8 hours until delivery.  
If penicillin allergy, high risk (e.g., anaphylaxis, angioedema, respiratory distress, urticaria):  
- Clindamycin: 900 mg IV every 8 hours until delivery. If sensitivities unavailable, then give vancomycin (1 gram IV initial dose every 12 hours until delivery). If isolate susceptible to clindamycin and erythromycin, they give clindamycin (900 mg IV initial dose every 8 hours until delivery).  |
| Notes: | Tocolysis is contraindicated when risks of use outweigh potential benefits (e.g., in case of nonreassuring fetal status, severe preeclampsia or eclampsia, maternal bleeding with hemodynamic instability, chorioamnionitis, PROM, or agent-specific maternal contradictions).  
In multiple-gestation pregnancies, use tocolytics judiciously. In these pregnancies, tocolytics have not been shown to improve outcomes and are associated with a greater risk of maternal complications such as pulmonary edema.\textsuperscript{ACOG1} |
ALGORITHM: PTL ASSESSMENT AND MANAGEMENT

Pregnant patient with symptoms consistent with PTL (a)

PERFORM initial assessment upon admission
- **Determine** presence/frequency of contractions (palpation and external monitor), and other signs and symptoms of PTL. (a)
- **Determine** whether there is uterine bleeding (suggesting placental abruption, placenta previa).
- **Check** fetal well-being with electronic fetal monitor (EFM).
- **Send** urine for urinalysis (UA) with reflex to urine culture if positive.
- **Perform** sterile speculum exam: Visually inspect for PROM, cervicitis, umbilical cord prolapse, or fetal prolapse; assess cervical dilation and effacement; obtain and hold fetal fibronectin (fFN) and GBS culture before digital exam (if penicillin-allergic, request sensitivities at time of culture).

**If evident intrauterine infection, placental abruption, or fetal compromise:**

- **Deliver** expeditiously

**MONITOR cervical change**
- **Check** for cervical change with serial digital exams every 1–2 hours
- **Cervical change?**
  - **Yes**
    - **Discard** fFN
    - **Discharge** home, and **follow up** for PTL (b)
  - **No**
    - **Send** fFN
    - **TVU available within 12 hours?**
      - **Yes**
        - **Discard** fFN
        - **Discharge** home, and **follow up** for PTL (b)
      - **No**
        - **TVU available?**
          - **Yes**
            - **Triage** based on cervical dilation
          - **No**
            - **Admit** for inpatient management

**Admit for inpatient management**
1. **Transfer** to tertiary care center as per leveling criteria.
2. **Consult** maternal-fetal medicine, neonatology.
3. **Give** IVF hydration.
4. **Send** GBS culture and CBC.

**Give medication for:** (see page 21)
- **Fetal benefit** (betamethasone to lower risk of RDS; magnesium sulfate for neuroprotection)
- **Tocolysis** (for short-term pregnancy prolongation)
- **GBS prophylaxis** (per Perinatal GBS algorithm)

**Perform** key tasks at delivery
- **Perform** delayed cord clamping (recommended in all vigorous term and preterm infants 30–60 seconds after delivery)
- **Obtain** cord gas

**Move** infant to newborn/NICU, and **initiate** postpartum care for mother.

**Note:** Use Preterm Labor Protocol Orders

**Low Risk** (CL ≥ 3 cm)
- **Discard** fFN
- **Pass**

**Medium Risk** (CL 2–3 cm)
- **Send** fFN
- **Positive**
  - **Send** GBS culture, and **follow up** for PTL (b)
- **Negative**
  - **Send** urine culture, and **follow up** for PTL (b)

**High Risk** (CL < 2 cm)
- **Discard** fFN
- **Pass**

**Perform** transvaginal ultrasound (TVU)
- **Triage** based on CL
- **Determine** risk of PTB

**TVU available?**
- **Yes**
  - **Triage** based on cervical dilation
  - **Determine** risk of PTB
- **No**
  - **Send** fFN

**CL < 2.5 cm**
- **Admit** for inpatient management
  - **Transfer** to tertiary care center as per leveling criteria.
  - **Consult** maternal-fetal medicine, neonatology.
  - **Give** IVF hydration.
  - **Send** GBS culture and CBC.

**CL ≥ 2.5 cm**
- **Notify** perinatal care manager; then, **discharge** home, and **follow up** for PTL (b)

**See** page 23 for algorithm notes (a) and (b).
### ALGORITHM NOTES

<table>
<thead>
<tr>
<th>(a) Signs and symptoms of PTL</th>
<th>(b) Follow-up after evaluation and discharge for PTL</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Menstrual-like cramping, low back pain</td>
<td>• Instruct patient to call if additional signs and symptoms of PTL (give <em>Preterm Labor Discharge Instructions</em>)</td>
</tr>
<tr>
<td>• Uterine contractions</td>
<td>• Schedule a visit within 1 to 2 weeks</td>
</tr>
<tr>
<td>• Vaginal discharge</td>
<td>• Complete 48-hour steroid window as an outpatient</td>
</tr>
</tbody>
</table>

Cervical change, effacement, and/or dilation are included in PTL diagnostic criteria; the algorithm indicates how cervix should be assessed.
WEB RESOURCES

- SelectHealth Healthy Beginnings (a free program for expectant mothers to help patients have a safe and healthy pregnancy) selecthealth.org
- March of Dimes Prematurity Campaign marchofdimes.org
- Association of Women’s Health, Obstetric, and Neonatal Nurses’ (AWHONN) Prematurity Resource Center awhonn.org

INTERMOUNTAIN CLINICS

- McKay-Dee Maternal Fetal Medicine 4401 Harrison Blvd, #4600 Ogden, UT 84403 801-387-4647
- Maternal Fetal Medicine Specialists 5121 Cottonwood St, Ste 100 Murray, UT 84107 801-507-7400 801-507-7493 (fax)
- Utah Valley Maternal Fetal Medicine 1034 N 500 W Provo, UT 84604 801-357-7706 801-442-0745 (fax)
- Dixie Maternal Fetal Medicine 544 S 400 E St. George, UT 84770 435-688-4770 435-688-4835 (fax)

PROVIDER AND PATIENT RESOURCES

Provider education and tools

For Intermountain tools related to this topic, go to www.intermountainphysician.org/clinical programs, and select Preterm Labor from the Clinical Topics A–Z list.

Resources include:
- CPMs and guidelines
- Patient education

For Intermountain tools related to substance use screening and treatment, see the following CPMs:
- Assessment and Management of Substance User Disorder
- Assessment and Management of Opioid Use in Pregnancy
- Tapering Opioid Pain Medication

Consults and referrals

- Diabetes education and medical nutrition therapy. These services are covered by most commercial insurance providers and by Medicaid. For help locating diabetes educators in the area of your practice, call Intermountain’s Primary Care Program at 801-442-2990.

- Care management. SelectHealth and Medicaid patients are eligible to receive one-on-one support, educational materials, and follow-up phone calls to support best practice in prenatal care and high-risk pregnancy management. Call the Healthy Beginnings care management intake number at 801-442-5052.

- Referrals for SUD and mental health. For opioid dependence in pregnancy, refer patient to medication-assisted therapy (MAT) with methadone (first line) or buprenorphine. Also consider mental health referral and cessation support groups (such as 12-step organizations). Use the Substance Abuse and Mental Health Services Administration (SAMHSA) website to locate providers: www.findtreatment.samhsa.gov.

- Maternal-fetal medicine specialists. For a consultation or referral, contact one of the Intermountain clinics listed at left.
Patient education material

Providers can order Intermountain patient education booklets, fact sheets, and trackers for their patients from Print It, Intermountain's Design and Print Center for one-stop access and ordering of Intermountain-approved education.

Note that four fact sheets directly support the preventive recommendations in this CPM (available in both English and Spanish):

- **Preterm Birth Risk Worksheet.** Use with patients after a spontaneous or indicated PTB to explain the circumstances of the PTB, document the patient’s recurrence risk, and promote appropriate follow-up evaluations and preventive measures.

- **Preterm Birth: 10 Steps to Help Prevent It.** Use with all patients to explain key measures to lower their risk for preterm delivery. Includes general recommendations (e.g., use of highly effective contraception to ensure safe interpregnancy interval) and those for women at increased risk (17P, cerclage).

- **17P for Preventing Preterm Birth.** Use with select patients to support informed consent for this therapy.

- **Cervical Cerclage.** Use with select patients to support informed consent for this intervention.

See the list below for other fact sheets related to this topic. All fact sheets are available in both English and Spanish.

- Anticoagulant Injections
- Birth Control Basics
- Birth Control Pills: 5 Things You Need To Know
- Diabetes Care Before and During Your Pregnancy
- Epilepsy and Pregnancy
- Fetal Movement Counting
- Fetal Testing: Nonstress test, amniotic fluid assessment, and biophysical profile
- Gestational Diabetes Mellitus (GDM)
- Hysteroscopy
- Newborn Withdrawal
- Preeclampsia
- Opioid Pain Medicine in Pregnancy
- Sterilization
- Substance Use During Pregnancy
- Surgery During Pregnancy
- Trichomoniasis
- Vaginal Infections: Yeast or bacteria
- 24-Hour Urine Specimen

*Note: Each of these patient resources is available in both English and Spanish.
REFERENCES


This CPM presents a model of best care based on the best evidence at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base. Send feedback to Amy Campbell, Intermountain Healthcare, Operations Director (interim), Women and Newborns Clinical Program, amy.campbell@imail.org.